

# DATA SHEET

## CARBON FILM RESISTORS

General Purpose

CFR Series

$\pm 2\%$ ,  $\pm 5\%$

1/6W to 3W

RoHS compliant & Halogen Free



**YAGEO**

Product specification – April 3, 2024 V.3





## APPLICATIONS

- All general purpose applications
- Power applications

## FEATURES

- AEC-Q200 qualified
- Wide resistance range
- High stability
- PPAP ready  
(CFR-25/CFR50S)
- RoHS compliant &  
halogen-free

## ORDERING INFORMATION

Part number of the general purpose carbon film resistor are identified by the series, power rating, tolerance, packing, temperature coefficient, forming and resistance value.

## PART NUMBER

<b>CFR</b>	<b>200</b>	<b>J</b>	<b>T</b>	<b>-</b>	<b>73-</b>	<b>100R</b>
(1)	(2)	(3)	(4)	(5)	(6)	(7)

**(1) SERIES NAME**

CFR Series

## (2) POWER RATING

-12 = 1/6W	-50 = 1/2W	200 = 2W
25S = 1/4W	100 = 1W	3WS = 3W
-25 = 1/4W	2WS = 2W	1WS = 1W
50S = 1/2W		

### (3) TOLERANCE

$G = \pm 2\%$   $J = \pm 5\%$

#### (4) PACKAGING

R = Reel Pack  
T = Box Pack

B = Bulk

### (5) TEMPERATURE COEFFICIENT OF RESISTANCE

- = Based on spec , please refer to page 4 Table 2

## (6) FORMING

26- = 26mm	M = M-Type Forming
52- = 52.4mm	MT = MT Type Forming
73- = 73mm	MB = M-form W/flat
73G = 73mm, $\Phi d \geq 0.6\text{mm}$	FT = FT Type Forming
26A = 26mm, $\Phi d = 0.4 \pm 0.02\text{mm}$	F = F Type
26C = 26mm, $\Phi d = 0.5 \pm 0.02\text{mm}$	FK = FK Type
26G = 26mm, $\Phi d \geq 0.6\text{mm}$	FFK = F-form Kink
52A = 52.4mm, $\Phi d = 0.4 \pm 0.02\text{mm}$	FKK = FKK Type
52B = 52.4mm, $\Phi d = 0.45 \pm 0.02\text{mm}$	PN = PANAsert
52C = 52.4mm, $\Phi d = 0.5 \pm 0.02\text{mm}$	AV = AVIsert
52G = 52.4mm, $\Phi d \geq 0.6\text{mm}$	FB= FB- Type (for -25&50S)
52H = 52.4mm, non-painting on welding spot	

Note: 26mm, 52.4mm and 73mm represent dimension A of the axial type, please refer to the category of AXIAL/REEL TAPE SPECIFICATION for the detail.

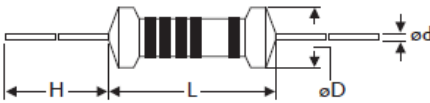
### (7) RESISTANCE VALUE

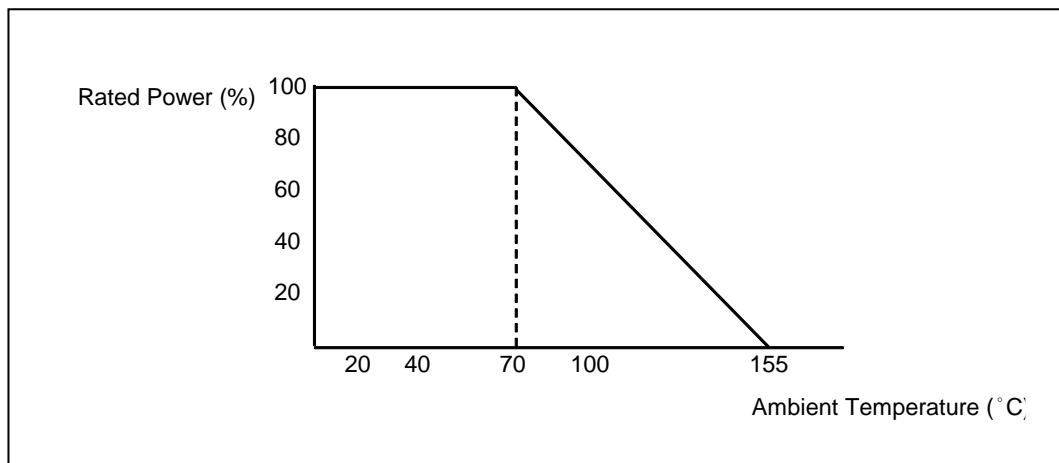
## E24 Series

Example:

100R = 100Ω, 10K = 10,000Ω, 1M = 1,000,000Ω

**DIMENSIONS**

Unit: mm						
	Normal	Miniature	L	$\psi D$	H	$\psi d$
	CFR-12	CFR 25S	$3.4 \pm 0.3$	$1.9 \pm 0.2$	$28 \pm 2.0$	$0.45 \pm 0.05$
	CFR -25	CFR 50S	$6.3 \pm 0.5$	$2.4 \pm 0.2$	$28 \pm 2.0$	$0.55 \pm 0.05$
	CFR -50	CFR 1WS	$9.0 \pm 0.5$	$3.3 \pm 0.3$	$26 \pm 2.0$	$0.55 \pm 0.05$
	CFR 100	CFR 2WS	$11.5 \pm 1.0$	$4.5 \pm 0.5$	$35 \pm 2.0$	$0.8 \pm 0.05$
	CFR 200	CFR 3WS	$15.5 \pm 1.0$	$5.0 \pm 0.5$	$33 \pm 2.0$	$0.8 \pm 0.05$

**DERATING CURVE****ELECTRICAL CHARACTERISTICS****TABLE 1**

CHARACTERISTICS	CFR -12	CFR 25S	CFR -25	CFR 50S	CFR -50	CFR 1WS	CFR 100	CFR 2WS	CFR 200	CFR 3WS
Power Rating at 70 °C	1/6W	1/4W	1/4W	1/2W	1/2W	1W	1W	2W	2W	3W
Maximum Working Voltage	150V	200V	250V	300V	350V	400V	500V	500V	500V	500V
Maximum Overload Voltage	300V	400V	500V	600V	700V	800V	1000V	1000V	1000V	1000V
Voltage Proof on Insulation	300V	400V	500V	500V	500V	700V	1000V	1000V	1000V	1000V
Resistance Range	1Ω ~ 10MΩ for E24 series value									
Operating Temp. Range	- 55°C to +155°C									
Temperature Coefficient	see Table 2									

Note: For resistance value out of above range is by request.

**TABLE 2 TEMPERATURE COEFFICIENT**

TYPE	Temp. Coefficient ppm/°C		
	Under 100KΩ	100K ~ 1MΩ	1M ~ 10MΩ
CFR100, CFR200, CFR2WS CFR3WS	± 350	-500~0	-1500~0
CFR-12 , CFR-25 , CFR-50 CFR25S , CFR50S , CFR1WS	- 500 ~ +350	-700~0	-1500~0

**TEST AND REQUIRMENTS**

TEST	TEST METHOD	PROCEDURE	APPRAISE
Short Time Overload	IEC 60115-1 4.13	2.5 times RCWV for 5 sec.(Not more than maximum overload voltage)	±0.75%+0.05Ω
Voltage Proof on Insulation	IEC 60115-1 4.7	In V-Block for 60 sec. test voltage as above table	No Breakdown
Temperature Coefficient	IEC 60115-1 4.8	Between -55°C to +155°C	By Type
Insulation Resistance	IEC 60115-1 4.6	In V-Block for 60 sec.	>1,000MΩ
Solderability	IEC 60115-1 4.17	245±5°C for 3±0.5 Sec.	95% Min. coverage
Solvent Resistance of Marking	IEC 60115-1 4.30	IPA for 5±0.5 Min. with ultrasonic	No deterioration of coatings and markings
Robustness of Terminations	IEC 60115-1 4.16	Direct load for 10 Sec. in the direction of the terminal leads	≥2.5Kg(24.5N)
Periodic-pulse Overload	IEC 60115-1 4.39	4 times RCWV(or Umax., whichever less) 10,000 cycles (1 Sec. on, 25 Sec.off)	±1.0%+0.05Ω
Damp Heat Steady State	IEC 60115-1 4.24	40±2°C,90-95% RH for 56 days, loaded with 0.1 times RCWV (or Umax., whichever less)	±3.0%+0.05Ω
Endurance at 70°C	IEC 60115-1 4.25	70±2°C at RCWV(or Umax., whichever less) for 1,000 Hr.(1.5 Hr.on,0.5 Hr. off)	±3.0%+0.05Ω
Temperature Cycling	IEC 60115-1 4.19	-55°C → Room Temp. → +155°C → Room Temp.(5 cycles)	±1.0%+0.05Ω
Resistance to Soldering Heat	IEC 60115-1 4.18	260±3°C for 10±1 Sec., immersed to a point 3±0.5mm from the body	±1.0%+0.05Ω

Note:.

### RCWV (Rated Continuous Working Voltage):

The DC or AC (rms) continuous working voltage corresponding to the rated power is determined by the following formula:

$$V = \sqrt{P \times R}$$

or max. working voltage whichever is less

Where

V=Continuous rated DC or

AC (rms) working voltage (V)

P=Rated power (W)

R=Resistance value ( $\Omega$ )

### PULSE DIAGRAMS

